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## In Memoriam

Samuel Wendell Williston  
1852-1918

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SAMUEL WENDELL WILLISTON



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# SIGMA XI QUARTERLY

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## A TRIBUTE TO THE LIFE AND WORK OF SAMUEL WENDELL WILLISTON

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## SAMUEL WENDELL WILLISTON

### THE MAN AND THE PALEONTOLOGIST

Our distinguished senior colleague in vertebrate paleontology passed away August 30, 1918, honored and beloved by all who knew him. He seldom spoke of himself to his scientific associates, still less of the long struggles which beset his early career, and we owe to unpublished autobiographical notes, written in May, 1916,\* the full and thoroughly American history of the period of his boyhood, youth and early manhood, in which the beginnings of his scientific life on the western frontier, in the 60's of the last century, are delightfully portrayed. Our admiration for Williston's character and attainments is enhanced when we follow his early steps and see how his strong predisposition to a life of scientific research finally prevailed over all difficulties. The story reveals a lofty spirit and unfaltering determination, which affords a splendid example to many of our youth, whose careers are rendered easy by the wonderful facilities of laboratories and museums in all parts of our land, who may thus fail to acquire the rugged determination which Williston transferred from his manual to his intellectual life.

Williston tells us that his father's family goes back to 1630, in Massachusetts. His father was naturally intelligent but never learned to read. His mother's family came from England near the close of the War of 1812. She was well educated. He himself was born in Roxbury, now a part of Boston, July 10, 1852. His earliest recollections are of the torchlight celebrations of the John C. Fremont campaign of 1856. Considering his subsequent fame from the study of the Permian amphibia, it is interesting to note that among the first memories of his childhood is one of a collection of toads, which he proceeded to plant in the garden to see them grow, after the manner of potatoes.

In the spring of 1857 the Willistons emigrated to Kansas. The trip was long and tedious by rail to St. Louis, then a small town, thence by steamboat up the Missouri River to Leavenworth—there was no Kansas City then—followed by a long and tiresome drive of 115 miles to Manhattan. Their home was a small log cabin, about

\*See *Recollections*, an unpublished autobiography, written May 1916, copyrighted by Mrs. S. W. Williston. Also *Biographic and Scientific Notes on S. W. Williston*, by Prof. William K. Gregory, Mss. Osborn Library, American Museum of Natural History.

15 feet square, containing a single room below and a loft above where the four boys slept. Indians were numerous and occasionally troublesome. Here young Williston began school, and in a small library, provided by the Emigrant Aid Society, he recalls finding Stevens' *Antiquities of Central America*, which he read when he was about seven years old, also Prescott's *Conquest of Mexico*.

His first collection of fossils was from the Blue Mont, a high bluff just north of Manhattan, where he discovered some fossil shells. He was told by his father and by his Sunday School teacher that they had been left there by the great deluge, which once covered all the earth. His favorite swimming hole was among some large stones filled with fossil shells of lower Permian age, and these constituted his first observations in paleontology, when but seven years of age. At the age of nine he assisted his father, attending the engine of a saw and grist mill. During this time he also got his second lesson in natural history, in observing the anatomical differences between various kinds of fishes,—catfish, shad and buffalo, and river sturgeon of the Blue River.

Blue Mont College, founded by the Methodists in 1859, became merged into the State Agricultural College in 1864, and Williston was a very happy boy when in 1866 he was permitted to enter it at the age of fourteen. His school days were interspersed with hard manual labor and with learning the printer's trade, his first article being a humorous contribution about the capture of Jefferson Davis, published at the age of thirteen.\*

His studies at the College continued with two most influential events, first, the reading of Lyell's *Antiquity of Man* at the age of fifteen, which at once convinced him of the truth of the doctrine of evolution; and, second, the remarkable teaching of Professor Benjamin F. Mudge. Williston writes; "I studied every study that he taught and they were many,—Natural Philosophy, Chemistry, Botany, Geology, Zoölogy, Veterinary Science, Mineralogy, Surveying, Spherical Geometry, Conic sections, Calculus, etc. Mudge had a considerable collection of fossils and minerals that filled a long case. To me it was a wonderful museum. There were no laboratories of any kind, no microscopes and but few instruments. The College cata-

\*It is an amusing parallel that at the corresponding age of thirteen, the present writer was engaged in printing, typesetting, press work, and editorial work on a small boys' journal.

logue of about that time enumerating their equipment, gravely mentions an electric machine, three Leyden jars and six test tubes. The electric machine was a never ending source of delight. The Professor occasionally got it out and charged the Leyden jars, and then with hands joined in a circle gave us a shock. He prophesied that some day, electric light would take the place of other illuminations. My ambition was to make a machine myself, and I nearly succeeded, but I found no way of boring a hole through the glass plate for the shaft. The oxyhydrogen light was another wonder. My greatest interest was given to physics or natural philosophy as it was then called. I read every book on the subject that I could get in the library. Chemistry had second place, while biology interested me but little."

We observe that in this preparation for a really great subsequent scientific career, Williston found Lyell, the master who inspired Darwin. He also came under the influence of a most genial and inspiring teacher; the range of his reading as well as of his studies was extremely broad; he showed a marked predisposition for the study of fossils and for comparative anatomy.

He now began to undergo one physical difficulty after another in search of means of living and of carrying on his education; he tried the printing office, also engineering in which he became an expert assistant; at one time he was eager to be an engineer and studied all the books that he could get. It was this profession that prepared him for his field life for his subsequent observations in geology. After three years' experience as a civil engineer, his life took a complete turn, when he began the study of medicine with his old family physician. Freely using the doctor's library, Williston turned to his initial studies in anatomy and physiology, which laid the foundation of his anatomical training and ultimately qualified him for a professorship in the Medical School of Yale University. At the same time, chemistry was more seriously studied. On returning to the Agricultural College, Professor Mudge renewed his great personal influence, and Williston entered on more advanced lines of thought. At the age of twenty-two he was elected the first President of the Kansas State Agricultural Alumni, and chose for his address a tirade against the study of the ancient languages.

In the meantime, he had become an enthusiastic disciple of Darwinism, which was not at that time accepted as a demonstrated fact. In February, 1874, he delivered in the local Congregational Church

what he believed was the first public lecture given west of the Mississippi River in favor of evolution. Perhaps the most signal and unique demonstration of the doctrine of evolution was the famous specimen of *Ichthyornis*—the bird with teeth—discovered by Professor Mudge in 1872. Mudge was at the time extending his geological journeys into western Kansas and invited Williston to go with him. This was really the turning point in Williston's life; it came about through a fortunate accident. He writes that a college friend, Brous, was invited by Professor Mudge to accompany him, and that through Brous he also was invited. The decision to go was accidental and thoughtless yet it led to his life's devotion to paleontology. Had he not accompanied Mudge and Brous, in all probability he would have continued as a practitioner of medicine somewhere in Kansas. The experiences with Mudge were epoch-making; wonderful specimens were sent to New Haven and described by Professor Marsh. Two seasons were spent in this way, chiefly along the Smoky Hill Valley and as far west as Fort Wallace, where he had adventures among the Indians. He accepted an invitation to follow the collections to New Haven and to work under Professor O. C. Marsh. He writes: "It was thus with feelings almost of awe that I met Professor Marsh for the first time at New Haven, Connecticut, on March 19 or 20, 1876. My heart was in my mouth when I knocked at the basement door of the old Treasury Building, and heard the not very pleasant invitation to 'come in.' There was a frown on Marsh's face, accentuated by his nearsightedness, as he waited for me to state my business. No doubt he thought me a wild and woolly westerner in my military cloak, slouch hat and cowboy boots as I stammered my name. But he quickly made me feel more at ease. He found me quarters in a little building in the rear of Peabody Museum then approaching completion. The next day he set me at work studying bird skeletons with Owen's *Comparative Anatomy* as a guide. He was then deeply interested in his *Odontornithes*, and wanted newer specimens especially of the smaller forms which were very difficult to find in the Kansas chalk. For recreation I helped a few hours every day to carry trays of fossils to the Museum."

It is important to dwell in detail on these early steps of Williston's career, because they are of such forceful interest to young men. His subsequent life also had many episodes in which he was always surrounded with difficulties. In September, 1877, he was sent

to the great Upper Jurassic beds, containing giant Sauropods, near Cañon City, Colorado, and Como, Wyoming. In 1878, he made his first brief communication on these animals, but was given no opportunity for further publication in vertebrate paleontology during the nine years (1876-1885) that he worked in Professor Marsh's laboratory. As there seemed to be no opening in paleontological research, Williston turned again to the study of Diptera, which he had begun many years before in Kansas. This became his avocation, and his numerous publications on the flies have given him a leading position among American, if not among the world's, students of these insects. His connection with the Yale Medical School began in 1885-1886 as Demonstrator of Anatomy, and was followed by a professorship of Anatomy 1886-1890, also by the practice of medicine.

The most fortunate turn of Williston's life was his recall to Kansas as Professor of Historical Geology and Anatomy in the University of Kansas. He soon began to publish on the Cretaceous reptiles of the sea and air of that ancient territory,—the plesiosaurs, the mosasaurs, the sea turtles, the pterodactyls. He renewed his explorations in western Kansas and at the same time sustained his two avocations of anatomy and dipterology. It was characteristic of his many-sidedness that he served as Professor of Anatomy and Dean of the Medical School. In 1897 he returned to the subject of the amphibia, the animals first observed in his early boyhood, and published the first of his long series of notable papers on the extinct amphibians, which constitute one of his most permanent claims to fame as a paleontologist. Ten years later the Palaeozoic reptiles first attracted his attention.

In 1902 he was called to the University of Chicago, as Professor of Vertebrate Palaeontology, the highest post of its kind in this country. In addition to his arduous labors as lecturer and teacher he completed his special papers, memoirs and bulletins on the Cretaceous sea reptilia and also brought to a conclusion his life studies on the Diptera, publishing the third edition of his *Manual of North American Diptera* in 1908,—a classic work on this subject.

Now began the more extended and exclusive studies and researches on the life of the Permian period, to which Williston has made monumental contributions and which continued up to the very hour of his last illness. As the scientific successor of the great Cope, who first made known these remarkable reptiles, and continuing the



special studies of Dr. George Baur, he began to publish in 1907, and during the next decade poured out a series of papers which all together constitute his greatest and most original contributions to science. It was in the extremely intricate and complicated osteology of these extinct forms that his long and precise training, his passion for accuracy of statement and description, came to bear. Aided by Mr. Paul C. Miller, a collector and preparator of exceptional ability, he undertook a long series of field explorations in the Permian of Texas, which yielded results of the greatest importance to vertebrate morphology and paleontology. These expeditions brought back to the University specimens which have become classics in their completeness and beauty of preparation. He extended his studies to the Marsh collection in the Yale Museum and to the great Cope collection in the American Museum of New York. Form and function, structure and habit, movement and environment were always closely related in Williston's mind and observations, as they have been by the greatest paleontologists from the time of Cuvier to the present day. He first developed his life theories of the reptiles of the Kansas seas and their environment, and his work along these important lines of interpretation, especially in their adaptations to aquatic life, are summarized in his delightful volume, *Water Reptiles of the Past and Present*, published by the University of Chicago, 1914.

It is a matter of lasting regret that a greater treatise summarizing all of his researches on the habits and structure of the extinct reptilia was not brought to completion. This would have contained an epitome of all his life work and would have marked the close of an important epoch of exploration on the Paleozoic and Mesozoic reptiles and amphibians. We hope that this treatise will pass into the hands of one who is both willing to do justice to Williston's great work and competent to sustain the high level which marked his entire scientific career.

All scientific men have their special aptitudes, but very few cover so broad a field and so many subjects with such signal success as did Williston. Few have overcome greater difficulties or have kept the life goal more steadily in view. He strove arduously through forty years of investigation to discover new material and to widen the firm basis of fact in many distinct fields. He preferred to discover new material of his own rather than to work over old material or to reinterpret the work of others. Nevertheless, espe-

cially in his latter years, he labored very successfully to coordinate the work of his predecessors and colleagues, as, for example, in the classification of the extinct amphibia and reptilia, in which he surveyed the previous work of Cope, Osborn and others, with clear discrimination.

Although he ardently adopted the theory of evolution and was ready to embrace new ideas from every source, yet his views on standards of classification, like his views on paleontology problems, were uniformly sober, moderate and well considered. He carried his rare sense of humor and genial spirit into all that he said and all that he wrote, as well as into his addresses and speeches. His career marks the transition period between the work of the founders of American paleontology—Leidy, Cope and Marsh—and that of the large and increasing younger school of men who are taking up this wonderful subject and who may well follow his high example of unswerving integrity as an observer and broad philosophy as a generalizer.

While we sorrow over his loss and keenly miss him from our councils, it is delightful to recall that his personal relations with colleagues, assistants and students were eminently kindly. He was very generous in his praise of the work of other men and showed none of that jealousy which had so long blighted the progress of American paleontology and served to warp and suppress the truth.

HENRY FAIRFIELD OSBORN



## SAMUEL WENDELL WILLISTON

### A STUDENT APPRECIATION

From the life of men whose passage is marked by a trace of durable light, let us piously gather up every word, every incident likely to make known the incentives of their great soul for the education of posterity.

LOUIS PASTEUR.

Into the life of every student there comes, sometime, the influence of a teacher which is most powerful in the shaping of his after course. So varied is the form under which this influence manifests itself that it might almost be said to be individual in its nature. A word, a look, an act, may be more effective than years of teaching or multitudinous precepts. It is not always, or commonly, that the formal and meticulous teacher inspires enthusiasm and awakens ambition, and it is often the surprise of the schoolmaster type to find that a colleague of most unpedagogical habits has the largest following of disciples. Such a man was Samuel Wendell Williston of whom it is now my sad task to write, so that in the archives of the Sigma Xi there may be recorded for those who knew him not the personal estimate of his scientific children, whom I am asked to represent.

It is right that this should be done, both in honor to a former president of the society and as a concrete example of a method of teaching which produces results such as the society is organized to promote.

In 1890 Doctor Williston came to the state university of his beloved Kansas, nominally as professor of geology but actually as a teacher of many subjects besides, including anatomy, physiology, histology, embryology, evolution and meteorology. To all of these varied topics he brought the same true scientific method—it mattered not the subject of his course, the view-point and treatment were the same. This breadth of vision was at once recognized by all the teachers of science in the school and soon drew students to him in considerable numbers.

My own recollections of him are most varied. During his first years at Kansas I was in the Pharmacy school and came into contact with him only rarely, but it was impossible to forget these meetings. It happened that among the numerous interests which he early acquired in his new surroundings there was a camera club of which

he was president. The dark room adjoined a laboratory of the chemistry building in which I worked. One day I saw a large, energetic and somewhat unkempt gentleman busily engaged with a camera making lantern slides. From day to day he returned to his task and I was tempted to make enquiries regarding his work, but, being a humble Freshman in the Pharmacy School, I could not muster up courage to speak. What I dared not do he however made easy for me by approaching my desk to enquire what engaged my attention under the microscope. With this simple enquiry began a friendship whose influence upon my life can not be measured. Soon I had learned about the making of lantern slides and also what the particular ones were for upon which he labored. There was to be a series of public lectures upon evolution, inaugurated by the redoubtable champion of Darwin, Chancellor Snow, some of which were to be given by the diligent maker of lantern slides. My interest in the photographic processes and their manipulator grew and I marveled at his successful efforts and equally at his failures. The means did not concern him—only the end. My tidy and orderly instincts were shocked at the frank and unconcerned admission that he expected to spoil every other plate, and it was beyond my comprehension how his methods produced such good results. I never did learn how, in his disregard for detail, he accomplished such accurate work.

Later I went to the lectures on evolution and had a new and surprising view of my photographic friend. Instead of the genial and unconventional laboratory worker there stood an earnest and imposing gentleman in frock coat, who, in high pitched voice and rapid utterance, talked for an hour upon a subject which my freshman, pharmaceutical mind followed most limply. Although it is a quarter of a century ago I can recall in detail the voice and gestures of this astonishing man who, upon one day, could be so simple and common, and upon the next the inspired prophet, in public exposition, of philosophies which profoundly moved his large and critical audience.

Thereafter I looked forward with added interest to his dark room visits, hopeful of learning something of the new world of which he had spoken so strangely. My expectant eye must have caught his attention, for in the intervals of his photographic labors, he would wander over to my desk and talk with me about subjects suggested by our tasks. These talks finally led to the subject of microscopical

technique and I learned, much to my delight, that there were processes far more delicate and refined than the simple ones which I was using in my work in pharmacognosy. An invitation to visit his laboratory followed my show of interest and, on a never to be forgotten day, I was introduced to the mysteries of the paraffin and collodion methods of section cutting. Following this there were other informal expositions of matters microscopical and I was allowed to use the rotary microtome and his own large microscope. The inevitable result of all this was that I cast aside all thoughts of returning to the life of a pharmacist and became resolved to take the time for a collegiate degree. In this resolve I had the insistent advice and encouragement of another of my teachers, but from Doctor Williston I caught a vision of the life of an investigator beside which other careers were without interest. But, with characteristic fairness, he repeatedly pointed out that there was no money in such a following, and that unless I were willing to live as he did I should choose another and more lucrative calling. When I had once decided upon my course, however, he made every effort to aid me, and in this endeavor he never slackened his purpose so long as he lived.

During the time that I was working for my bachelor's degree I kept in touch with my mentor, taking meanwhile an elementary zoology course which he gave one year in collaboration with Vernon Kellogg. As I noted his wide range of interests I was much surprised and puzzled that he should devote so much of his time to the study of old bones, of the most distorted and fragmentary character often times. After taking a course in historical geology with him I began to learn something of their scientific value, but it was not until much later that I comprehended the reason of their great attraction for him.

In my senior year I started to take his course in histology, but near the middle of it, his work became so heavy that he asked me to undertake the conduct of the course. In this way I was thrown into more intimate contact with him and the following year, when I returned from Columbia, he invited me to room at his home. In every way he was aiding and encouraging me, and, as I look back upon these years, I see that he was planning and contriving for my development as he would for that of a son. Later, when I had scientific children of my own, he aided me in judging them and in forwarding their interests, and I learned more fully of his intense personal con-

cern for students. This very desire to be individually helpful made him impatient of large classes and less successful in their conduct. After a time he began to consider them somewhat of an intrusion on his real work. It is reported that on one occasion while busily at work upon some particularly interesting bones he was much disturbed by a noisy class across the hall. Finally, becoming too much annoyed to work, he decided to investigate the situation to see if the instructor could not quiet his class and found that it was his own.

By a rearrangement of the biological courses I was later removed from under Doctor Williston and placed in the zoology department. This did not alter his interest in my work and I was going to him constantly for help and guidance, as were many of the instructors in science. By degrees he was relieved of most of his numerous "ologies" and in later years had only human anatomy and paleontology to care for. His connection with the Yale Medical School had given him an interest in this part of university work and he undertook a vigorous campaign to establish a first class school of this character at Kansas. He was appointed on the State Board of Medical Examiners and became well and widely known to the profession of the state. It is not too much to say that he had their entire confidence and, had he remained to continue the work, would have made the progress of the school much more rapid and certain.

A narrower restriction of his work to anatomy and paleontology made possible the stronger development of these subjects and he plunged vigorously into them. While he was much interested in the anatomy, because of its vital connection with the Medical School, his delight was in the study of the rapidly accumulating collections of cretaceous fossils from western Kansas. With the cordial sympathy and support of Chancellor Snow he contrived to get assistance in the work of preparing, cataloging, drawing and studying the remains of the strange and interesting creatures of the ancient Cretaceous sea now exposed in the weathering chalk cliffs. Each phase of the work he himself was able to carry on, and all his assistants were trained by his own precept and example. I recall that he even brought in lithographic stones and instructed his artist in the process of lithography. He drew well and many of the illustrations in his papers were from his own hands.

It was a busy time about the laboratory for several years and there issued forth many papers of enduring worth. Two complete

volumes of the state geological survey were taken up with the record of investigations into the vertebrate paleontology of Kansas. To make easier the publication of researches he agitated for the establishment of a journal and, as a result, there appeared the *Kansas University Quarterly* which still continues as the *Science Bulletin*. The change of name is indicative of the preponderating influence which lay back of, not only this journal, but also most of the productive work of the school. Doctor Williston, more than any other man in the institution, understood and lived the life of a real investigator, and the students who went out from his laboratory carried the inspiration and methods of his life with them. They now occupy positions of influence in many institutions of the country where they carry forward the ideals which he set before them in the word and deed.

Not content with all the variety of effort which his teaching duties demanded, nor with the intensive investigations in paleontology, Dr. Williston continued the interest in entomology which an unjust restriction on his research activities at Yale had forced upon him. He published papers upon Diptera and aided students in this subject who came to the University attracted by his presence. It is indicative of his great breadth of understanding that he should be known as the most authoritative dipterologist in the country as well as one of its greatest vertebrate paleontologists.

Despite his absolute fairness and unselfish disposition it was inevitable that in a school of this size there should be jealousies aroused by the prominence of one of its men. That this should be so in his case was always a source of wonder and regret to Doctor Williston. The time came eventually when the consciousness of this adverse feeling became so strong with him that he could no longer endure the thought of it and, when opportunely an offer came to him from Chicago, which promised new and unfettered conditions for work, he reluctantly accepted it. With no bitterness but with a sense of shame and hurt he left the institution where he had planned to complete his life work. The feeling of regret which this step occasioned him he never lost, and frequently in his later letters I find expressions of longing to be back in Kansas. A hope that something would take him back never entirely left him, and the home he had built near the University he retained in this hope. Sometimes he even ventured to express this compelling desire. Thus I find in a letter of March, 1908



the following: "I am looking forward to retiring in a few years and then going back to Lawrence to devote the remainder of my life purely to research—entomology or paleontology, it matters little." Whether pleasure or disappointment came in his new surroundings this longing for Kansas was always with him and frequently, in later letters, I find expressed the wish that we might be there together again, with another friend who was also called to work elsewhere. This constant homesickness could not fail to react upon his health. In 1912 he wrote: "After ten years' absence I long as much as ever for Kansas—am still homesick."

With his departure from Lawrence our opportunities for personal intercourse were much reduced, but letters took their place and I find that my files contain a large number, considering that they came from a notoriously poor correspondent. On looking them over I recall that they contain much that is indicative of his character and philosophy of life. It is fortunate that I can present him partially in his own words because of this circumstance.

There is much to show his continued interest in the people and institutions of his former home—such an interest as only a most loyal and devoted man could have. Year after year there are questions and advice about the students passing between our laboratories. Of one he speaks as of a son, over whose scientific faults he has spent sleepless nights; of another as a source of continued satisfaction because of his solid progress. His appreciation of the proper method of securing success appears in the discussion of another student "If he would only go to work with all his energy to accomplish some special and useful work, the things would come to him in the end, which he now seeks to obtain by 'influence' and 'pull.'" Perhaps nowhere better than in advising me does he show in these letters his real attitude toward scientific work. Among numerous passages I find the following typical statements: "Have patience and WORK," "Keep at it, eternally doing research work." How characteristic of his own habit are these admonitions! Sometimes he descended to details, as when he wished to encourage me to go into the field after fossils: "You will never know what vertebrate paleontology mean, nor experience the real paleontological enthusiasm until you have found and dug out specimens yourself. The delights of collecting in a new field will give you the most exquisite pleasure you have ever had in natural history." This pleasure in collecting, which, indeed, led him

into paleontology, was very real and vital for he says in one letter (1908) "I renew my youth each time that I chase down the fossils in their native lairs" and again in 1910 "The year is wearing upon me—I wish I could be in the field again after fossils." Even when he felt that his time was near his mind turned to this source of comfort and strength as is shown in one of his letters (1918) "I am somewhat worried, I have not been well for the past two months. . . . I have also planned to go with my assistant into the field during March—in Texas—collecting, with an auto. I hope the outdoor work will make me feel better."

For a man of an impulsive nature as was his, he showed, upon mature consideration, most excellent judgment. This I noted in a great many instances, and am reminded of it by another bit of advice regarding collecting in one of his letters: "Don't try to mix fossil collecting with bug hunting—they won't mix. That may seem strange advice to you, and you will be inclined to resent it—but it is the result of thirty-five years experience. As many things as you choose, *but only one thing at a time*. . . ." This was, indeed, his own method of work and he threw himself wholly into whatever line of study he decided upon, and left the other things to other times. It was therefore a great relief when he went to Chicago and found himself free of the numerous subjects that had confined him at Kansas. In the first letter I received from him he says "It is very pleasant to be relieved of everything but paleontology, I have nothing else to think about."

The work he had left behind engrossed his attention very much and his early letters contained many references, especially to those phases which fell to my care. Naturally the paleontology was much in his mind, as some of the quotations I have given show. He begrudged no time or effort to help this work along, and I think his greatest disappointment in me was that I did not drop everything else and continue the development of the collections and publications at the rate he had started them. This he constantly urged, and if he suspected my inability to follow the path he had laid out for me he charitably refrained from saying so. The Medical School was also an object of his lively interest and I went to him many times for advice in the troublesome days of its extension into a full four years course. In the matter of medical education he saw far ahead of the time and predicted most accurately the course of events which we have since witnessed.

The same good judgment held with regard to the character of the future development of the College of Arts. Although he had had a thorough and extended training in Greek and Latin and continued to use these languages in his studies, he decried the effort to make their study obligatory on everyone. The only reference to this topic is in connection with a report of his efforts to secure, through the alumni of the State College of Agriculture, an action that would help to bring this School and the University into direct cooperation instead of continuing the competition that limited the usefulness of both. Concerning this he says in a letter of January twenty-first 1909: "You know my notions regarding College and University education—its adaption to *all* classes of people, not merely for the so-called learned professions. For these principles I like to fight and am now fighting with all the strength I can for the Agricultural College that it may become, as it must and shall, a genuine college of high rank teaching the applied sciences."

As a national president of the Sigma Xi his concern for the organization was great. He believed thoroughly in its purposes and he considered it the one organization in the country best adapted to carry forward the great principles of scientific research. Believing as he did, and acting as he believed, it was natural that he should be much about the business of the society and his letters contain many references to visits to different chapters, on which occasions he nearly always delivered addresses. These are many of them permanently recorded and do not need mention here. I note in his letters nothing but a spirit of optimism in all he has to say about the Sigma Xi, and his example should be a perpetual source of encouragement to us when discouragements come, as they must. One of his latest interests in the society was the *QUARTERLY* of which he was original editor and in which he thoroughly believed as a means of bringing the chapters into closer understanding and cooperation.

Energetic, hopeful and hard working he always was, but as the years passed a note of discouragement began to creep into his letters. The buoyant optimism of his early days began to break under the attacks of ill health. He left Lawrence tired after all the numerous duties which he had faithfully and well carried out at the behest of the University. Unexpected disappointment awaited him at Chicago, and the illness and death of President Harper caused him concern and delayed the developments of his plans. It was several years be-



fore the opportunities upon which he confidently counted came to him. By this time he was much worn and began ardently to hope for quiet and rest. In retrospect he wrote in a letter of June, 1913: "It is now thirty-seven years since I published my first scientific attempt: I know that I have not done as much as I hoped to do in life, when I was young and ambitious, and I sometimes wonder whether what I have done amounts to much. But it is too late now for regrets and I know that I have had a good time—many happy hours with bugs and bones. I am beginning to long for a rest—thirty years of teaching with not more than three months away from duties all told make me wish that I could have the few years that remain to me exclusively to myself." This somewhat pessimistic estimate of his work certainly was not justified by the output at this time, and I find what I take to be a fairer estimate of his own work in a letter written ten years before this in which he says: "Much of the best work I have ever done or shall do in science, was in entomology, but I suppose my reputation, whatever it is, will rest chiefly upon my paleontological work."

The sickness and death of his daughter Hyla, who was a great source of domestic comfort, bore heavily upon him and he writes with more than usual discouragement: "I begin to feel, as I never have before, the passing of the years." The brave spirit was beginning to find the buffetings of time and circumstance more than it could bear without costly effort. But even so it flashed forth with all its old cheer when I happened in on him unexpectedly in the spring of 1917. With an arm over my shoulder, he exclaimed with his characteristic geniality "Well, McClung, this certainly does my heart good." And then I was led into that paleontological sanctum, bestrewn as of yore with tobacco and burnt matches and exhibiting such an apparent disorder as to suggest that its occupant could not possibly find any needed articles, and there I saw the latest of his carefully executed drawings and heard of his most recent critical studies of Permian reptiles and amphibians. Again, as a quarter of a century previous I had marveled at the beautiful lantern slides and the hasty methods by which they were produced, I now contrasted the accurate and finished drawings with the apparent chaos from which they were emerged and wondered at the skill of their creator. After all these years I looked again upon the same kindly face as had warmed my first timid approach and saw there, shining forth un-

changed, except for an affectionate regard, the earnest and simple spirit of one of Nature's gentlemen. I left him standing arm in arm with a student in front of the museum watching the raising of the Allies' flags in honor of the visit of Marshall Joffre and the French mission. "It is a great day for us," he said as he waved me good-by.

A year later, drawn to Chicago once more by business of the Sigma Xi, I saw him again and for the last time. As always there was a smile of welcome, but it faded more quickly and anxious lines made their unfamiliar appearance. He had not been well since the Pittsburg meeting he told me, and he feared that something serious was the matter. That evening I dined with him and the family, which he had brought together, almost completely, in a new home, and we had a real reunion in which he took full part. But at the table the cause of his anxiety obtruded itself and he was obliged to decline a share in the good things so familiarly set out by the hands of Mrs. Williston and the girls. The war was strongly upon his mind and much of the conversation at dinner was upon this subject. He pored over the newspaper reports while we ate and expressed anxiety lest the "damned Huns" should take Paris in the anticipated offensive.

And thus I left him, bearing his own anxieties and sharing deeply the common trouble of the world over one of its tribes gone mad and blood thirsty. In his last delirium, they tell me, he wandered through devastated Belgium and sorrowed and raged at the pictures his fancy drew of the scenes over which he had brooded. In the summer a letter came bearing the woeful tidings that an operation had revealed a hopeless condition and before I had recovered from this shock a telegram followed saying that all was over.

Thus ended the life of a true teacher, a true scientist, a true friend and a real man. The world is much better for his living; many of us have found inspiration and guidance in his word and act. What I have here written is set down in the hope that this personal influence as well as his published works, may be made of service to those whom he delighted to serve. What is mortal of him lies in his boyhood home at Manhattan, Kansas, above the stream which passes by the College, which he loved because of what it gave him as a youth, and by the University which he loved because of what it gave it as a man. His last wish is gratified and he rests in the soil of the swelling plains of Kansas which typified for him the freedom of expanse of future scientific investigation.

University of Pennsylvania.

C. E. McCLUNG

## SAMUEL WENDELL WILLISTON

### THE ENTOMOLOGIST

Williston's scientific activities followed three quite well-defined lines,—paleontology, anatomy and entomology. He laid the foundations of the first in the field, working under Mudge in collecting material for Marsh. At the same time he was "reading" medicine in the winters with the family physician in Manhattan, Kansas, making almost unaided a beginning in anatomy, which through the attainment of his medical degree was to lead to the professorship in human anatomy in Yale Medical School and thus into a complex of activities, on one side touching medicine in the deanship of the medical department of the University of Kansas, on the other blending with his fossil studies into general vertebrate anatomy.

His entomological work was sharply distinct from the rest in one respect;—it was not at any time an official requirement or a bread-winning occupation, but began as the overflow of a brimming exuberance of activity in the direction least confined. He was not in his early years if ever in a position to make real advances in medicine; his palaeontological connections through a long and severe apprenticeship were such that he was confined to the humbler tasks and not allowed to publish. His ambition from an early age was to be a scientific man, and that he knew implied publication. He was forced to find an outlet so far removed from his official occupation that he might be free to work in it as he chose during his spare time.

Entomology attracted his attention on one of his summer expeditions in the seventies, when his chum Harry Brous, also a medical student in his winters, was collecting beetles as a side line. Williston tried this too, and by collecting and exchange accumulated 1200 named species. But he found the subject already pretty well studied, requiring a large library and the work of many years to attain a position where he might make valuable contributions. He cast about for a fresher field, and this time, in the spring of 1878, the Diptera or flies were his choice. He found room enough, for he was alone on the continent. Osten Sacken had just returned to Europe after some twenty years of activity in conjunction with Loew, which had resulted in several rather preliminary monographs and a serviceable catalogue. Aside from this but little had been done for a generation; back of that a few European writers had described North American species as exotic rarities, and there was some work by the immortal American, Thomas Say, who described in all orders.

Aside from the Loew-Osten Sacken collection, most or all of which was in Europe at the time, there was hardly a collection in North America containing more than two dozen correctly named Diptera. It was more than ten years later, according to reports, before there was a named specimen of *Musca domestica* in the National Museum.

All the guidance Williston had at first was what he could get from the Loew-Osten Sacken monographs. When he could trace a fly into one of these families, he had a good prospect of naming it; but with other families, and they were by far the most numerous, he had no way to get at the definitions of genera. His custom then was, as he often narrated to me, to take the fly in hand and read descriptions as he came to them, promiscuously, until he found one to fit. Many times this work led to nothing, and sometimes he succeeded after reading actually hundreds of descriptions. Entomology was the gainer from his difficulties however. When only a little later he got hold of Schiner's *Fauna Austriaca*, he was much impressed by the certainty, ease and rapidity with which he could find the family and usually the genus of his specimens, although the work was written for Austria. To publish something like this for North America became his ambition, which he cherished for many years and finally realized in somewhat modified form in the third edition of his *Manual of North American Diptera*, his last important contribution to entomology.

His first paper on flies was published in the Canadian Entomologist for November, 1879; it is of slight importance, dealing with some anomalies of venation in Bombyliidae. It does however show that he was questioning the definitions of genera even then. By 1882 he was publishing papers which showed his characteristic method, analyzing groups in tabular form. In 1886 he published his Monograph of the North American Syrphidae, the first monograph in the order by an American. Flies of this family are mostly of good size, many with pretty markings, and many abundant; hence they are often collected by the non-specialist, and he was able to get together a large amount of material. His work showed high taxonomic ability as well as a clear preception of the needs of dipterology in that day, for it was carefully adapted to beginners;—almost too much so, for as I have indicated elsewhere it created the impression that the family is an easy one, thus encouraging many beginners to publish in it before they were really prepared.

In 1885 he published a series of papers on the genera of some families of flies, which in 1888 he gathered with additions into a pamphlet of 84 pages. These analytical tables he revised and with further editions published in 1896 as a second edition under the title *Manual of North American Diptera*, this time as a clothbound volume of over 200 pages. His third and final edition, a fine volume of over 400 pages, was published in 1908; it contains analytical tables of all the families, and about a thousand figures, mostly drawn by Williston's own hand. This is conceded to be the best North American work extant on a large order, and has been influential in making the Diptera comparatively well known. There are many workers in the order now, all of whom are indebted to Williston for the great pioneer work that he accomplished.

In the nineties Williston busied himself mostly with tropical flies, the published results being mainly found in *Biologia Centrali-Americana*. As in his entomological beginnings he had no rivals, and he had some ten years the start of all who came after him, he easily maintained through most of his life the position of chief authority in the order; and his wide knowledge of genera and great ability made him recognized in Europe as one of three or four world authorities.

His chief interest was in genera and the higher categories, and this was increasingly true in his later years. He was a student of evolution in a large way, searching for generalizations. In this respect his entomological career blends into complete harmony with his other biological labors.

He loved the flies, primarily because he felt free when he worked on them; but also because they are abundant and rich in forms, can be collected and studied everywhere, and furnish numberless illustrations of evolutionary principles. Late in life he said to me, "The happiest hours of my life were those spent on the Diptera."

Another pleasure to him in this connection was the fact that several young entomologists came to work with him, although he gave no entomological courses, because they wanted to learn about flies. His heart went out to these young men. I was one of the little number, almost thirty years ago, and the hours I spent with him are among my treasured memories.

A great scientific authority, a helpful friend, a noble man.

U. S. Bureau of Entomology

J. M. ALDRICH



## SAMUEL WENDELL WILLISTON

### IN THE SOCIETY OF THE SIGMA XI

By an unhappy stroke of fate, the Society of Sigma Xi shortly after the loss of its founder and first President, Henry Shaler Williams, is also mourning the passing away of its second President, Samuel Wendell Williston on whose strong shoulders fell the major burden of the development and extension of the influence of the organization of the Society when in 1900 Professor Williams practically withdrew from his leading and guiding activities in the Society. The mantle of the founder could have fallen on no more worthy leader: Dr. Williston not only proved to be a vigorous and successful exponent of the importance of the Society as a factor in the life and promise of universities, which led to the establishment of new chapters in a number of the strongest Universities in the country, especially in the western states, but he was no less a champion of the highest ideals of the Society, appealing for the fellowship of investigators in all fields of effort to advance human knowledge by scientific research and emphasizing the importance of positive performance in research.

It was during Dr. Williston's presidency that such important centers of research activities as Leland Stanford University, the University of California, Columbia University, the University of Chicago, the University of Illinois, the Case School of Applied Science and Indiana University organized chapters which have belonged to the most active and productive in the Society. In the founding of these Chapters Dr. Williston was a leading influence, the incentive, the spark for inflaming enthusiastic support of the movement for the establishment of a Chapter coming often directly from his eloquent championship of the latent power of the Society as a nucleus for encouraging research. This debt of the Society to the genius of its second President was impressed on the writer most deeply in connection with the founding of the Chapter in his own institution, the University of Chicago, in 1903.

In his presidential address of 1902 Dr. Williston emphasized what is perhaps today the most important function of Sigma Xi Chapters in University life; the Sigma Xi *brings together* all those diversified research activities which normally pursue their own lines

of development in magnificent isolation. The Sigma Xi brings together as no other university agency does the astronomers, biologists, chemists, geologists, physicists, and other scientific men not only with a resultant increase in the understanding and sympathy for the work of their confrères, but often too with instance of such cross-fertilization of fields of thought, which give the strongest promise of original lines of investigation. It is indeed, in this mixing of the scientific trends of thought, in this relaxation from the narrowness of one's own field of effort, in the awakening to the inspiring progress made in other fields that perhaps the very greatest advantage of the establishment of Sigma Xi chapters in research centers is to be found. The importance of the emphasis on this point in Dr. Williston's presidential address of 1902 was recognized by the Society to the extent of the incorporation of its leading passages in the Constitution of the Society in the form of Appendix VI.

In this same address, Dr. Williston insisted on the desirability of having the beneficent influence of the ideals and aims of the Sigma Xi Society brought to bear on students at as early a date as possible, so that this influence might be of real weight and sometimes decisive, in encouraging any natural tendency toward research, indeed in giving birth to the fervor and enthusiasm for the search of new truth. In the long years that followed, Dr. Williston was no less ardent an advocate of this early connection between the Society and the student, but he also came to realize as many of us have done, that to fulfil its real mission, the fostering of research, the Society must put more emphasis in the future on positive achievement, on accomplishment in research, rather than on promise, on a mere interest in research that so often has remained absolutely sterile. Indeed, any one glancing through the pages of our Quarter Century Record and History with a searching, questioning mind, must be impressed by the comparative non-productiveness of a large proportion of our membership. It is a matter of common knowledge too that as yet election to Sigma Xi is not considered so signal an honor—for instance in the case of impartially minded foreigners—as some of us would most ardently desire to see it. Thoughts of this kind underlie the great movement of the last seven or eight years looking toward elevating the standard of membership in the Society, and in this movement Dr. Williston was one of the leaders. The Society faced the continuing vital need of contact with the young undergraduate student at as early a time in

his development as the aims of the Society made possible and at the same time it was confronted with the fact that unless it put greater emphasis on achievement versus promise in this time of thriving graduate schools and research institutions, it would be threatened by a loss of caste and prestige among those who realize what achievement means in science. The solution to the attainment of these two vital objects of the Society was seen in the revision of the Constitution which permits chapters to limit full membership to graduate students and faculty members who have already carried out research work and to grant associate membership to undergraduate students of special promise and attainments which make for research. Dr. Williston was a staunch advocate of this change in the constitution and those familiar with the evolution of this instrument will recognize in the forceful passages emphasizing research *achievement* his influence, indeed his actual wording.

In this development of the Society, Dr. Williston saw also the means for accomplishing the last of his farseeing hopes, the extension of chapters to all the productive research units of the country, large or small, university or college, technical school or institute of technology: with the condition that the smaller institutes, which have no graduate schools, would, if granted chapters, limit full membership to faculty members and elect undergraduates to associate membership only, which would be converted into full membership if the promise were converted after graduation into attainment and achievement in research, the way, it seemed to Dr. Williston, would be at last clear for extending our organization rapidly throughout the smaller institutions in the country without danger to its high ideals and to the insistence on productive work which must henceforth be our motto, if we are to maintain our standing among the great research movements of the present age.

The writer had the rare privilege of being closely associated with Dr. Williston and indeed owed to him the kindling of his own deep interest in the Society. He often conferred with Dr. Williston on the future of the Society and as to the steps which it would be wise to advocate. And to the last our great leader whom we have now lost, saw in his inspired vision the day coming when the Society would be flourishing throughout the country, with a chapter in every worthy institution large or small, and reaching out indeed for the extension of its growth to foreign countries, especially to Canada and to En-



gland—for research and science are international and truth the greatest blessing mankind could hope for. Such was the great and simple faith of Samuel Wendell Williston.

JULIUS STIEGLITZ  
*President of Sigma Xi*

## SAMUEL WENDELL WILLISTON

### A KANSAS TRIBUTE

Kansas has lost one of her foremost educators and the University of Chicago has lost one of its earnest and faithful professors in the death of Doctor Williston. He died on August 30, 1918, following an operation.

Doctor Williston was born in Boston, of New England stock, on July 10, 1852. He came, with his family, to Kansas in the early days of the making of the state and settled in Wabaunsee county and as this is near Manhattan it was natural that as soon as his course was completed at the public schools he should continue his work at the Kansas State Agricultural College, then in its infancy. There he graduated, with the degree of B.S. in 1872, and obtained his master's degree in 1875.

In the continuation of his studies he began a course in medicine at Yale University, where he graduated with the degree of M.D. in 1880. Continuing his scientific studies he obtained the degree of Ph.D. in 1885. While studying at Yale with Doctor O. C. Marsh he was assistant in paleontology, and laid the foundation of his broad knowledge of this subject, in which he later became so eminent an authority. For one year, 1886, he was assistant editor of "Science," an avocation which showed the broadness of his culture. He was also health officer for the city of New Haven from 1887 to 1889. From 1886 to 1890 he occupied the position of professor of anatomy at Yale University, following which he was elected professor of geology and anatomy and dean of the School of Medicine of the University of Kansas, and much of his best scientific work was done from 1890 to 1902 while he occupied this position. He was elected professor of vertebrate paleontology at the University of Chicago in 1902, which position he occupied at the time of his death.

While in Kansas Doctor Williston was appointed a member of the State Board of Health, and it was here that he showed his enthusiasm for work in behalf of the health of the community and his ability to get things done by injecting new life into this body. Since that time it has occupied a very enviable position and has ranked as one of the most efficient and progressive of the State Boards of Health.

Doctor Williston was also a member of the State Board of Medical Examiners in 1901-1902. He was a member of the Kansas Academy of Science and its president in 1907—and national president of the scientific society of Sigma Xi in 1901-1904, and a member of many learned scientific societies both in this country and abroad.

Those of us who have known Doctor Williston and have been intimately associated with him in his scientific work are unanimous in our appreciation of his broad learning, his knowledge of foreign languages and literature, his indefatigable enthusiasm for science, and his vigorous defense of what he believed to be right.

Doctor Williston began the study of the geology and paleontology of Kansas as early as 1874, while with Doctor B. F. Mudge at the Kansas Agricultural College. He spent over three years in field explorations within the state. For more than twelve years he was engaged in collecting material which, in connection with the collections of fossils made by Doctor F. H. Snow and Judge E. P. West, are used in the preparation of the Vertebrate Paleontology of Kansas as published in volumes IV and VI of the University Geological Survey of Kansas. The volumes are illustrated by a series of cuts prepared under Doctor Williston's direction, which are remarkable for their accuracy and perfection. In discussing this work the author says: "It is the aim in the present and following volumes so to picture and describe the fossils of the state that they may be understood by the ordinary reader of intelligence. But at the same time it is imperatively necessary that the descriptions should be accurate, and accuracy can only be obtained by the use of scientific language." Doctor Williston has done more than any other man to place the rich fields of vertebrate paleontology in Kansas before the scientific world.

An insight into the fairness and justice of Dr. Williston's character in all work of this kind is shown by his care to acknowledge the services of those who have helped to make it a success. He very frequently suggested and outlined work for the younger men which he was glad to have them publish in their own names. They, of course, acknowledged the assistance he had given them.

Besides the work above described Doctor Williston made numerous discoveries and has written many monographs on the Cretaceous mosasaurs, pterodactyls and plesiosaurs, and on the various Permian and Triassic vertebrates. In his chosen field he stood among the first men in the world, and was in intimate correspondence with the most famous continental geologist. His reputation was international.

The writer had some opportunity to know something of Doctor Williston's success in the management of scientific collecting parties, as it was his privilege in 1899 to accompany Doctor Williston, E. C. Case, H. T. Martin and others on an expedition to the Freezeout Mountains in Wyoming. It was a scientific stimulus to see Doctor Williston work early and late to provide for the camp, and to make the most of the opportunity for digging out the fossil reptiles of this inhospitable region. He was a very successful and enthusiastic collector, in Colorado, Dakota, Wyoming and Texas, as well as in Kansas. While working for Doctor Marsh, of Yale, it is related that on one occasion, when Doctor Williston had made an exceptional find in his exploration and showed it to Doctor Marsh, the latter, in his enthusiasm, pulled his valuable watch from his pocket and gave it to him as an expression of his appreciation of the work. This watch has always been kept as a prized relic in the Williston family.

It was not only as a paleontologist that Doctor Williston obtained a world-wide reputation, but his researches in entomology and especially upon the family *Diptera*, show his indefatigable ability for research. His book on the *diptera* of North America is a standard, both in this country and abroad.

As a teacher of science, not only in New Haven but also in the University of Kansas and the University of Chicago, Dr. Williston always carried with him the enthusiasm of his students. They knew that he would give them every encouragement and that he would generously contribute from his own store of information for their advancement. Some of his loyal students who received their inspiration from association with him and who have since attained a high standing in their profession are such men as Case of Ann Arbor, Riggs of the Field Museum, Rodgers of Leland Stanford, and Douthitt and Moore of the University of Kansas, Barnum Brown of the American Museum, New York, Sellards of Florida, Moodie of the University of Illinois College of Medicine, Chicago, G. I. Adams of Pekin, China, Beede of Indiana and Branson of Oberlin.

We shall always miss his hearty hand-shake and kindly greeting, his inspiring conversation of men and things scientific, and his vigorous personality, but at the same time we can but feel that he has not passed away without leaving an impress on the scholarship of the world, and adding a large chapter to our knowledge of the secrets of Nature.

University of Kansas

E. H. S. BAILEY

## SAMUEL WENDELL WILLISTON

### THE GREAT APOSTLE OF SIGMA XI

The Society of the Sigma Xi is called upon again to mourn the loss of one of its great leaders. No one came in contact with Doctor Williston without hearing of Sigma Xi; he was so full of the subject that it came out on every occasion and his enthusiasm inspired more than one indifferent member with zeal for the organization while it led those who did not know of it not only to look into its character but to endeavor to associate themselves with its work.

But while every one knew of this active interest there were few who are aware of the extent to which he had studied into the problems of the organization, suggested definite plans for its development and pushed them despite indifference and opposition to the point where they were taken up vigorously by the Society. No one knew this better than I who had the good fortune to be in personal contact with him at an early date; and from the mass of material gained by reading his letters I have gleaned a little that will be of special significance for this permanent record while at the same time it shows his early and almost intuitive perception of the difficulties which were to confront the organization with its development and the means which should be taken to meet and overcome these obstacles.

Professor Williston belonged to the Kansas Chapter which was organized in 1889 so early in the history of the Society that it seems never to have had a charter or a formal charter membership. Professor Williston was elected in 1893 and delivered one of the most important addresses before the chapter in June 1902. This was published under the title, *Higher Education in Kansas*, and enjoyed wide circulation. When he went to Chicago a movement was on foot for the establishment of a chapter there and he was called upon to preside at the first meeting when the chapter was installed on May 8, 1903. The part he played in that chapter is indicated in the *Quarter Century Record and History* and commented on by Professor Stieglitz in his tribute printed above.

One gets a vivid conception of his services to the Society in general from the number of responsible positions he has held. The lists in the *Quarter Century Record and History* show that he was Vice-president from 1899 to 1901 of the national organization, President from 1901 to 1904, chapter representative for the Kansas

chapter during 1895-1897 and again from 1897 to 1899, member of the Council from 1899-1904, Chicago representative 1907-1909, and member of the Council 1910-1911.

Mere perusal of these records fails to give any adequate conception of his activities. It was a strange thing for him to be absent from a meeting or to fail to bring to it helpful suggestions as well as well matured plans for the constructive work of the organization. As vice-president he presided over the Denver Convention in the unavoidable absence of the President, Professor Williams. The address of the Chairman which is printed in the Proceedings of the Fifth Convention outlines the main points of the address but fails, as any such brief statement must fail, to give an adequate idea of its character and influence. That was the second convention of Sigma Xi which I had attended and I well recall his splendid delineation of the origin of the Society, of its rapid and vigorous growth, of its increasing influence, especially in the great state universities of the Central West and of the effective stimulus to research which was the fruit of its efforts. No one who heard his portrayal of its standards and ideals, of the needs for research and the opportunity to stimulate it through this agency could have gone away without renewed enthusiasm for the organization and keener devotion to its work.

He presided over the sixth convention at Washington and his presidential address was printed in full in the proceedings and has been quoted widely since then. That part of it which deals specifically with the future development of the organization has stood ever since by vote of the convention as Appendix VI of the constitution. It was at that time that the first movement for modification of the badge, which was originally brought before the Denver Convention, took form through the appointment of a general committee concerning which Doctor Williston wrote me soon after the meeting at Washington announcing my appointment as a member of that committee and stating: "I think the Society in general desires some modification in the form [of the badge] though it is a question how great that modification should be \* \* \* I believe if any change is made it should be at once. Will you please place yourself in communication with these gentlemen at once. \* \*"

The Seventh Convention held at Philadelphia in December 1904 was also presided over by President Williston and his presidential



address is printed in full in the record of its proceedings. The item on which he laid greatest stress was the question of difference of opinion concerning the eligibility of undergraduate candidates for membership. He referred clearly to the difference in the character of the evidence in possession of teachers in applied science and those in pure science concerning the ordinary undergraduates with whom they come in contact and deplored the suggestions that different standards should prevail between the different schools of an institution. He urged the development of the closest union possible between pure and applied science together with frank and full recognition of the fundamental standard of membership and its impartial application to all alike. His thoughts on this subject may be well illustrated by two sentences from the address in which he says: "Perhaps the most imminent danger which confronts the Society is a too great liberality in dispensing its honors. While, as I have elsewhere urged, the Society should not and must not exist for the purpose of distributing honors, yet it must be very careful to whom its honors are given, that it may retain its high ideals and high standards."

At that convention he insisted upon retiring from the office of President and wrote me thereafter, in January 1904: "It was at my earnest request (perhaps also from the wish of the convention!) that I was relieved from the presidency. \* \* \* No one man can see all sides or appreciate all that is best for the Society. I am sure that the Society will continue to prosper but there are many new problems that must be fully met.

"Nearly two years ago we decided to publish an annual for the whole society and many are the inquiries I have received concerning it. I hope now that you will push the matter vigorously" [because I had been elected Secretary].

"We need very much a directory of the whole society and information concerning the working of different chapters, *lists of new members*, of various chapters, etc." This was the suggestion which led ultimately to the preparation of the Quarter Century Record and History.

Tho this marked his surrender of official authority he never lost his interest in the affairs of the Society, or his thoughtful planning for its future, and his active participation whenever anyone called upon him for advice or assistance in its work. It is a privilege to acknowledge here his constant willingness to advise and aid me

in the discharge of the duties of the office of Secretary. I never wrote him that I did not get an early and helpful response and I naturally grew to depend upon him as the one who could be called to assist whenever there was need.

The idea of making elections more significant was not abandoned with its mere statement in his last presidential address just quoted.

On October 10, 1905 he wrote: "The question of the conditions of election to membership is one of deepest moment to the Society, and I believe that it must soon come up in our national convention to the exclusion of all other things. Conditions have changed not a little during the past ten years, conditions which affect us closely. Before that time Phi Beta Kappa was disposed to elect only students of the classical courses. Now it is disposed to give its honors to students of all departments of the university not strictly professional, and in so far as it recognizes *scholarship* in science it conflicts with the older methods which prevailed in our society. I have not been at all sure that undergraduates should not be elected to membership [in Sigma Xi], but I suspect that they will finally be excluded except in those rare cases where research ability has been clearly proven.

"I found the question a burning one in——where I spent a week. There has been some friction at——because of the rigid insistence of conditions among faculty members. I ventured to suggest for the good of the chapter there that the line should not be drawn too strictly in the original membership but should be held sacred for all new members of the faculty.

"I wish that at the next convention the president or executive committee would appoint a number of the most active members of various chapters to prepare and read papers on *Conditions of membership* \*\*\* in other words that we have a symposium on the subject. The matter must be more clearly set forth and formulated than it has been in the past—all the chapters have had trouble and the condition will long confront us. We need more full discussion especially among the newer chapters. Publish your paper, it will help towards the final settlement of the matter."

One of the best statements of qualifications for membership which has been printed is that which he wrote for the *QUARTERLY* some years later:

"Attention is called to the communications in the present number of the *QUARTERLY* from Professors Prosser and Richtmyer concern-



ing the qualifications for membership in Sigma Xi. It has long been evident to those who have the welfare of the society at heart that the questions they propound are of vital importance; that, as Professor Richtmyer says, 'the most pressing need of the Society is some method of standardizing the criteria followed in the election of new members.' The editors will gladly receive communications from those who have suggestions to offer; and they urge that the subject be considered in every chapter.

"It is evident that an absolute standardization of the conditions of membership will be hard to attain; but it is also equally evident that a much more uniform standardization than now prevails among the different chapters can be and should be enforced. The present writer has thought much on these subjects during the past ten years, and he would beg to offer the following as his understanding of the conditions imposed by the constitution:

"First: What is included in a scientific investigation?

"Originality, either in the observation of new facts or in the deduction of new principles from previously known ones. No investigation should be considered as qualifying the candidate for membership that would not be accepted and published by a reputable technical journal or learned society as a real contribution to knowledge. Furthermore, investigation should not be accepted as satisfying the conditions of the constitution, unless of extraordinary merit, when there is reason for believing that the candidate will do no more research work.

"Second: What is meant by aptitude for scientific Work?

"Originality in the observation of new facts or in the deduction of new principles from previously known ones. The compilation of a text book, for instance, unless new methods are involved, does not make the writer an investigator. Such aptitude can only be satisfactorily determined by the actual performance of investigations sufficient to satisfy the proponents that the candidate not only can but will do such work.

"Third: Does the 'Giving promise of marked ability' as applied to undergraduates require the completion of research work?

"No; but it does mean more than the mere accumulation of knowledge. It means ability to use knowledge. It means originality, comprehension, application, and scholarship. However, if the amendments to the constitution, as proposed elsewhere in the

present QUARTERLY, or some modification of them concerning associate membership are adopted the chief danger that confronts the Society in the election of new members will be largely avoided. Diligent students with a strong love for science may then be admitted to probational membership with much good to themselves and to the Society.

"Fourth: How many graduates may be elected by a chapter?

"As many as show the necessary qualifications by the actual performance of meritorious research work. In general, all approved candidates for the doctorate in the university, under the limitations of the constitution, should be eligible for membership; and many of the approved candidates for the masters degree also.

"The writer fears that, in some chapters, the conditions of the faculty and graduate membership have not always been rigorously enforced. No faculty member should be considered as a candidate who does not possess the research spirit, either in the actual prosecution of research work himself or in his ability to guide and inspire students to do such work. The doctor of philosophy who has terminated his research work with his graduating thesis should, ordinarily, not be considered as eligible. Alumni membership is in a sense honorary membership, and especial care should be taken in its bestowal."

It would be helpful for all of us if this succinct and critical analysis of the situation might be read by every Board of Electors or every committee called upon to consider and recommend names for membership.

Professor Williston did not stop with the mere discussion of the topic. He followed up the matter by taking an active part in the committee which drew up the constitutional amendments that were presented to the Cleveland Convention and formed the basis of the conditions as stated in the present constitution. (See QUARTERLY, vol. 1, p. 94, December 1913.) In the same number is (p. 110) Professor Williston's review of the *Quarter Century Record and History* in which, without even casual notice of the fact that he was responsible for the original suggestion which led to the preparation of that book or that he had done much to determine its form and to secure the material that went into it, he attributes the entire credit for the work to the Secretary who, he at that time insisted, should say nothing of *his* part in the work.

In 1914 he was appointed member of a committee to revise the constitution and took active part in the remodeling of the document as it now stands. In fact the most important features of change are those which he himself had suggested. In addition to items already mentioned, I might call attention to his position with regard to the question of associate membership. In January 1908 writing of the Chicago Convention and the Council meeting of the same date he says: "A new proposition came up which to me is very pleasing—to establish a sort of Junior Society for undergraduates taken in at the beginning of the junior year and kept on probation until the end of the senior year. I think it will solve one of the grave defects of our Society, especially now that the tendency is to limit membership to graduates." And speaking further of the blank cards sent out to secure data concerning members to make a record he says: "This kind of a record was what I so earnestly desired."

Out of this grew the specifications of the committee of which he was chairman which proposed amendments to the constitution covering dual membership (*QUARTERLY* vol. 2, p. 58, September 1914). In this work he was associated with two other distinguished members and past presidents of the Society, Professor E. L. Nichols and President C. S. Howe. Their report is a model of lucidity and fairness and should be read by all who wish to get in maximum compass the data for an understanding of the questions at issue and the reason for the modification of the original plan of the Society in the election of members.

Professor Williston had been for years advocating the establishment of a Society publication. The plan which he had often discussed with individual members and perhaps had also mentioned in a more formal way was presented to the Cleveland convention at the evening dinner on January 1, 1913 when President Eddy as toast master called upon him as "one of the founders of the Society," an appropriate tho not literally correct designation. A brief note indicating the character of his appeal reads, "It seems desirable that the Society should publish a bulletin giving news of the various chapters especially with regard to research work done." The following day, January 2, 1913, when the convention discussed the matter as had often been done before and hesitated to adopt the plan because of evident difficulties he offered to undertake the onerous duties of serving as Managing Editor. This was enough to bring

the convention to favorable action on the proposition. How little they knew of his other responsibilities and of the sacrifice he made is indicated by his letter. On January 8, 1913, he wrote:

"In fact I got a little anxious, after I had, rather impulsively, made the proposition at Cleveland, since I have a book on my hands that I have promised the publisher by next June, and I have nearly all the illustrations to get ready. I have seen the procrastinating spirit of conventions, and especially our conventions for so long, that I thought if something definite was not proposed the whole thing would go over indefinitely. And, I believe, to keep up the higher rank of the Society, which will undoubtedly now be attempted, something of the sort will be absolutely necessary. ALL THAT I AM INTERESTED IN IS TO SEE THE THING STARTED.

"First of all the name of the publication must be decided upon. Second we must come to some conclusion as to what it shall contain. The first number containing the report of the convention will be nearly all provided for. I firmly believe that a bibliographic record of the publications at least of all new members, should form a part of it, and I believe also that such a record of all active members will do much to stimulate zeal among the chapters. The academic record of all new members, the line of work engaged in, the titles of any published papers, at least so far as student members are concerned, and probably now of all faculty members, since with few exceptions they will be all young men who have not done a great deal. And we should discourage the admission of faculty members who have not done creditable work. The news of all the chapters should be included, lectures, public addresses, etc. So also I would have included all new appointments of members, the changes of addresses of faculty members, etc."

Overwhelmed by responsibilities for scientific work which he was publishing he begged me to help him out and as a friend I was only too glad to come to his relief. How real his editorial burden was is indicated by many letters, for he, despite other heavy responsibilities, did all the correspondence while that year I only handled the material that he collected and cared for the mechanical part of publishing it. Thus in writing me November 23, 1913, about the December QUARTERLY for which he had agreed to furnish certain copy he says "I am still waiting anxiously to hear from.....and.....and

.....and.....and.....to all of whom I have written urgently. All promised articles before the first of the month. You see if they keep their promises there will be more than we can use."

And again, "I have received a report from the .....Chapter, but as usual without the qualifications of graduate and alumni members. I have sent back the list of names for additions. I observe the report of the.....Chapter is also deficient. I am tired of returning so many of them.....But I am not discouraged. Sigma Xi will arise all the better [from this agitation] and on a higher plane than ever before."

In 1917 at the meeting of the Executive Committee in Chicago Doctor Williston attended the evening dinner and discussed the general policy and development of the Society with wonted vigor and enthusiasm.

The last letter Professor Williston wrote me about the Society and its activities was dated December 3, 1917. In it he said:

"I shall certainly be at Pittsburgh if I am able to consume my daily rations, and my appetite is good now!

"I only fear that if I get to talking at the Sigma Xi I may speak rather vigorously. It seems to me that there is a great future before the Society if we will only recognize it, and I get impatient with those who would stifle it and make it a toy society. I am obliged to you for sending the..... circular.....I had not seen it, and I shall have something to say about it."

He *did* reach Pittsburgh and took part in the convention for he spoke at the dinner pointing out forcefully the tremendous increased possibilities that were offered to Sigma Xi by the European war and by the inevitable destruction of productive research in European universities. He urged as the paramount need of the Society fuller knowledge of work done in its various units with much closer cooperation between chapters.

It is not too much to say that no man has done more to initiate movements of significance to the Society than Professor Williston and no man has been more active for a longer period of years. It is fortunate indeed that in the period when Sigma Xi grew from a little organization to a powerful educational factor embracing in its activities the length and breadth of the nation he should have preserved constant and active interest in its work and have been willing

to contribute, often at a sacrifice, to directing its policy. Historically the Society cannot look upon him as one of its founders, but as the years pass by it will recognize more and more clearly in him one of its greatest organizers and builders.

HENRY B. WARD  
*Secretary of Sigma Xi*

1852

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1875

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1878



# SAMUEL WENDELL WILLISTON

## CHRONOLOGY

- 1852 Born July 10, in Roxbury, now part of Boston, Mass.
- 1857 Removed with parents to Manhattan, Kansas.
- 1859 Began reading books, and in a few years read hundreds of volumes.
- 1865 Began to learn the printer's trade on the local paper in Manhattan.
- 1866 Entered the State Agricultural College in Manhattan.
- 1868 Taught a country school for board and ten dollars a month.
- 1869 Ran away from home and began working on railroad as laborer; changed to axman, rodman, and in 16 months was transitman at \$125 a month, when barely 18, but was obliged to resign from severe malarial attacks.
- 1870 Resumed college course.
- 1872 Graduated from Agricultural College in March. Spent summer in railroad engineering work, but the company went into bankruptcy in the fall, and thereafter he could not find employment as an engineer, the panic having stopped all railroad construction. Played cornet at country dances in Southern Kansas to earn a few dollars the following winter.
- 1873 Began to "read" medicine in the office of Dr. Patee, in Manhattan. In the fall became interested in chemistry in the new laboratory of the agricultural college.
- 1874 Delivered a lecture advocating the Darwinian theory in February, before a debating society in Manhattan. Elected first president of the Agricultural College Alumni Association in the spring. In July joined Professor Mudge in Western Kansas, collecting fossils for Professor Marsh, of Yale College; worked until late November for twenty-five dollars. Reading medicine again in winter.
- 1875 Worked from spring until September in Mudge's party, collecting fossils. Then went to University of Iowa and studied medicine during winter.
- 1875 Obtained master's degree from Kansas Agricultural College.
- 1876 Medical term ended March 19, leaving him penniless. Received invitation from Marsh to come to New Haven. By selling his watch and borrowing money was able to accept. Marsh after a few days acquaintance induced him to sign a contract for three years' work at \$40 per month, and he went back to Kansas under Mudge in the fossil field again. Became interested in beetles as a side line. Worked on fossils in New Haven the following winter.
- 1877 In charge of Marsh's party in Kansas this summer, and interested in birds as a side line. Continued in field work in Wyoming into January.
- 1878 Returned to Yale in January. In the spring had charge of a party in Wyoming, and this time began to collect and study flies (Diptera), in which he first attained distinction, although after some years.

- 1879 A new three-year contract with Marsh provided for medical study which he resumed. Did not work in the field this summer.
- 1880 Graduated from Yale Medical School, a Doctor of Medicine. Appointed Assistant in Osteology under Marsh.
- 1881 Appointed Assistant Paleontologist in the U. S. Geological Survey, to work on the Marsh collections. Married to Miss Annie I. Hathaway.
- 1885 Severed connection with Marsh. Granted degree of Doctor of Philosophy by Yale College. Declined offer to become first assistant to C. V. Riley, U. S. Entomologist, and began the practice of medicine in New Haven. In the fall, however, accepted assistant editorship of Science, occupying most of his time for a year; but from September was also Demonstrator of Anatomy in Yale Medical, in evening work.
- 1886 Assistant Professor of Anatomy, resigning work on Science. Town physician, and still practising on the side.
- 1886 Published Monograph of N. A. Syrphidae, the first monograph of a family of flies ever published by an American.
- 1887 Full Professor of Anatomy in Yale Medical.
- 1887-1889 Health officer for the city of New Haven.
- 1890 Professor of Geology in University of Kansas.
- 1893 Elected to membership in Sigma Xi.
- 1894 Dean medical department University of Kansas in addition to previous work.
- 1896 Published another edition on Diptera (Second edition).
- 1897 Published his first paper on the extinct amphibians.
- 1898 Published Report University Geological Survey of Kansas, vol. iv.
- 1900 Published same, vol. vi.
- 1901 President of Sigma Xi, continuing until 1905.
- 1901-1902 Member of Kansas State Board Medical Examiners.
- 1902 Professor of Paleontology, University of Chicago.
- 1907 President of Kansas Academy of Science.
- 1908 Published manual of Diptera, third edition, with 1000 figures.
- 1911 Published American Permian Vertebrates.
- 1913 Delegate to International Zoological Congress in Monaco. Received honorary D.Sc. from Yale University.
- 1914 Published Water Reptiles of the Past and Present.
- 1915 Elected member National Academy of Sciences.
- 1915 Elected Honorary Fellow Entomological Society of America.
- 1916 Wrote Recollections, an unpublished autobiography.
- 1918 Died August 30, in Chicago.

# CHAPTER OFFICERS LIST FURNISHED BY THE CORRESPONDING SECRETARIES OF THE CHAPTERS

CHAPTER	PRESIDENT	VICE-PRESIDENT	REC. SECRETARY	COR. SECRETARY	TREASURER
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Union.....	Ernest J. Berg....	Mortimer King....	Mortimer F. Sayre.	*	Mortimer F. Sayre
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Nebraska.....	F. W. Upson.....	W. C. Brenke....	Margaret Hannah..	*	N. A. Bengston...
Ohio.....	Chas. W. Foulk...	Edgar N. Transau..	F. E. Bear.....	*	Wencel J. Kositr..
Pennsylvania....	I. W. Harshberger	H. C. Richards...	Wm. H. F. Addison.	*	J. Percy Moore...
Brown.....	A. DeF. Palmer...	A. E. Watson....	J. A. Hall.....	P. H. Mitchell....	C. H. Currier....
Iowa.....	A. C. Trowbridge..	Richard P. Baker..	Dayton Stoner....	*	Homer L. Dodge..
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Chicago.....	James R. Angell..	Forest R. Moulton	Arno B. Luchardt..	*	Arno B. Luchardt
Michigan.....	E. C. Case.....	A. M. Barrett....	H. A. Glasen.....	*	H. H. Higbie....
Illinois.....	Chas. Zeleny....	R. D. Carmichael..	E. H. Williams....	*	H. J. Van Cleave..
Case.....	C. L. Eddy.....	W. R. Veasey....	C. W. Coppersmith.	*	P. E. Sabine.....
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Missouri.....	A. Lincoln Hyde..	E. B. Branson....	W. A. Tarr.....	*	L. Haseman.....
Colorado.....	P. G. Worcester..	L. B. Arey.....	C. W. Huntington..	*	Junius Henderson.
Northwestern...	William C. Bauer..	L. H. Pennington..	Lewis H. Weld....	*	Keith K. Smith...
Syracuse.....	C. I. Corp.....	W. J. Mead.....	George T. Hargitt..	*	F. C. Kruskopf....
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Texas.....					

\* Offices of Recording and Corresponding Secretary combined according to advice of Convention. Corrected up to May 1, 1919

## OFFICIAL ANNOUNCEMENTS

### SIGMA XI PUBLICATIONS

QUARTER CENTURY RECORD AND HISTORY bound in electric blue cloth. 1886-1911. 7,500 names. 550 pp. \$2.50.

QUARTERLY, Volumes 1-6, 1913-18, four numbers each, unbound, 50 cents per each volume. Forwarded prepaid on receipt of draft or money order in payment of the amount indicated.

Title page and Table of Contents of any volume on request.

Those ordering a complete set of the QUARTERLY and HISTORY will receive in addition until the supply is exhausted without extra cost a copy of each of the Proceedings of the early Conventions as follows:

Seventh (Philadelphia) Convention. 1904. Pamphlet. 15 pp.

Eighth (New York) Convention. 1906. Pamphlet. 7 pp.

Ninth (Chicago) Convention. 1908. Pamphlet. 14 pp.

Tenth (Baltimore) Convention. 1909. Pamphlet. 6 pp.

Eleventh (Boston) Convention. 1909. Pamphlet. 16 pp.

Twelfth (Minneapolis) Convention. 1910. Pamphlet. 27 pp.

Thirteenth (Washington) Convention. 1911. Pamphlet. 27 pp.

Later conventions are reported in the QUARTERLY.

### PRINTED BLANKS

The General Convention has instructed the Secretary to forward to chapters under the following stipulations:

Membership Certificates, stamped with the great seal of the Society. In packages of fifty prepaid, on advance payment of \$2.50 for each package. Please specify carefully whether for regular or associate members.

Index Cards, provided a duplicate set be sent for the general index of the Society maintained in the secretary's office. Gratis.

Statistical Record Blanks, for submitting annual reports giving chapter officers, elections, and other statistical data. Gratis.

### MAILING LISTS FOR THE QUARTERLY

Chapter secretaries are requested to furnish a correct list of mailing addresses of active members for the printer. Blank forms. Gratis on demand.

The mailing list should be sent early in September and be valid for the academic year. All changes of address and all other correspondence should be addressed to the Secretary of Sigma Xi, Henry B. Ward, Urbana, Illinois.